



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 50865 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 02/00047	International filing date (day/month/year) 04.01.2002	Priority date (day/month/year) 04.01.2002
International Patent Classification (IPC) or both national classification and IPC H04B7/26		
Applicant NOKIA CORPORATION et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.
- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 02.06.2003	Date of completion of this report 16.04.2004
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 02/00047**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*):

Description, Pages

1-12, 15-18	as originally filed
13, 14, 19	received on 07.11.2003 with letter of 06.11.2003

Claims, Numbers

1-18	received on 07.11.2003 with letter of 06.11.2003
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Drawings, Sheets

1/3, 3/3	as originally filed
2/3	received on 07.11.2003 with letter of 06.11.2003

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-18
	No: Claims	
Inventive step (IS)	Yes: Claims	1-18
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

- D1: ANONYMOUS: '3GPP TS 25.221 V4.2.0 (2001-09) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Physical channels and mapping of transport channels onto physical channels (TDD) (Release 4);' INTERNET ARTICLE, [Online] Retrieved from the Internet: <URL:http://www.3gpp.org> [retrieved on 2002-03-07]
- D2: ANONYMOUS: '3GPP TR 25.858 V1.0.0 (2001-12) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; High Speed Downlink Packet Access: Physical Layer Aspects (Release 5)' INTERNET ARTICLE, [Online] Retrieved from the Internet: <URL:http://www.3gpp.org> [retrieved on 2002-03-07]

2. Claims:

2.1 Claim 1:

The document D1 is regarded as being the closest prior art to the subject-matter of method claim 1, and discloses:

A method for High-Speed Downlink Packet Access (HSDPA) signalling for Time Division Duplex (TDD) mode of a wireless communication system including the mapping of paging indicators to the Paging Indicator Channel (PICH) bits and the transmission and numbering of paging indicator carrying bits in a PICH burst. D1 also mentions four reserved bits (currently unused) for possible future use adjacent to the midamble in a PICH burst.

D2 describes the associated signalling for the High-Speed Downlink Packet Access (HSDPA) for TDD mode with a Downlink Dedicated Physical Channel (DPCH) carrying a High-Speed Downlink Shared Channel (HS-DSCH) Indicator (HI). In D2 the HI consists of one information bit which indicates, that the User Equipment (UE) has to read the HS-DSCH in the same Transmission Time Interval (TTI).

Problem to be solved:

To provide a more efficient use of the available resources (number of downlink

channels, bandwidth etc.) and to avoid rescheduling of the Dedicated Channel (DCH) especially in case of fast changing conditions.

Solution:

In the present application the reserved and currently unused bits on the Paging Indicator Channel (PICH) are used to transmit High-Speed Indicator (HI) information to indicate a mobile terminal device or a group of mobile terminal devices to receive and decode signalling information on the High-Speed Shared Control Channel (HS-SCCH) without involving the Dedicated Channel (DCH).

The subject-matter of claim 1 differs from D1 and D2 in that

- (1) High-Speed Indicators (HI) are included into the slot structure of the Paging Indicator Channel (PICH) and
- (2) the HI comprises a plurality of identification bits.

The combination of the features of claim 1 is neither known from, nor rendered obvious by, the available prior art. Therefore, claim 1 meets the requirements of Article 33(2) and (3) PCT.

2.2 Claims 2-14

Claims 2-14 are dependent on claim 1 and add further features to claim 1 and thus also meet the requirements of Article 33(2) and (3) PCT.

2.3 Claims 15 and 16

Independent claims 15 and 16 refer to a computer program comprising code means and a computer program product comprising program code means stored on a computer readable medium. Claims 15 and 16 relate to the independent method claim 1, involves a further technical effect and therefore meet the requirements of Article 33(2) and (3) PCT.

2.4 Claims 17 and 18

Independent claims 17 and 18 refer to a mobile terminal device and a wireless communication system adapted to perform a method according to independent claim 1. Therefore, claims 17 and 18 meet the requirements of Article 33(2) and (3) PCT.

- 3 The term "adapted to perform a method" used in claim 18 is probably an error and should obviously read "adapted to perform each of the steps of the method" (cf. the term "each of the steps of the method" in claims 15-17).

Amended Claims

- 5 1. Method for High-Speed Downlink Packet Access (~~HSDPA~~) signaling for Time Division Duplex (~~TDD~~) mode of a wireless communication system, comprising the following steps:
a base station (~~node-B~~) sending indication information to a mobile terminal device (UE);
the mobile terminal device (UE) identified by the said indication information receiving signaling information;
said mobile terminal device, based on the said signaling information, decoding packet data
10 information;
wherein a High-Speed Indicator designates a specific mobile terminal device accessible in a downlink channel,
characterized by the steps of :
- including said High-Speed Indicator (~~HI~~) into the slot structure of a Paging Indicator
15 Channel (PICH), said High-Speed Indicator (~~HI~~) comprising a plurality of identification bits, each identification bit being assigned.
- 20 2. Method according to claim 1, wherein said plurality of identification bits are four identification bits arranged in two pairs each of two bits on either side of and adjacent to a midamble area of said Paging Indicator Channel (PICH).
3. Method according to any one of the preceding claims, comprising following further steps:
- dividing a plurality of mobile terminal devices upon a plurality of groups.
- 25 4. Method according to claim 3, comprising following further steps:
- assigning certain periods of time to each group,
wherein each mobile terminal device of a group receives data transmitted within said periods of time assigned to said respective group via said Paging Indicator Channel (PICH).
- 30 5. Method according to claim 3 or claim 4, comprising following further steps:
- assigning a High-Speed Indicator (~~HI~~) to each mobile terminal device of a group.
6. Method according to any one of the claims 3 to 5, wherein said periods of time of a group are assigned according to the data traffic of the group.
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7. Method according to any one of the preceding claims, comprising following further steps:
 - receiving information on said Paging Indicator Channel (PICH) by a mobile terminal device.
- 5 8. Method according to any one of the preceding claims, comprising the following further steps:
 - receiving signaling information on a High-Speed Shared Control Channel (HS-SCCH) by a mobile terminal device.
9. Method according to claim 7, comprising the following further steps:
 - 10 - receiving and decoding data packets on a Downlink Shared Channel (DSCH) by a mobile terminal device,
wherein the receiving and decoding step employs said signaling information received on said High-Speed Shared Control Channel (HS-SCCH).
- 15 10. Method according any one of the preceding claims, comprising following further steps:
 - transmitting transmission related information.
11. Method according any one of the preceding claims, wherein said identification bits codes a binary address of a mobile terminal device.
- 20 12. Method according claim 1 to 11, wherein said identification bits codes a logical address of a mobile terminal device.
13. Method according any one of claims 3 to 6, wherein said dividing a plurality of mobile terminal devices upon a plurality of groups is based on the data traffic.
- 25 14. Method according any one of claims 3 to 6, wherein said dividing a plurality of mobile terminal devices upon a plurality of groups is based on an N channel Hybrid Automatic Repeat Request (~~HARQ~~) scheme.
- 30 15. Computer program for executing method for High-Speed Downlink Packet Access (~~HSDPA~~) for Time Division Duplex (~~TDD~~) mode of a wireless communication system, comprising program code means for carrying out each of the steps of any one of the claims 1 to 14 when said program is run on a computer, a network device, a mobile device, or an application specific integrated circuit.
- 35

16. Computer program product comprising program code means stored on a computer readable medium for carrying out each of the steps of the method for High-Speed Downlink Packet Access ~~(HSDPA)~~ for Time Division Duplex ~~(TDD)~~ mode of a wireless communication system of any one of claims 1 to 14 when said program product is run on a computer, a network device, a mobile device, or an application specific integrated circuit.
17. Mobile terminal device for High-Speed Downlink Packet Access ~~(HSDPA)~~ for Time Division Duplex ~~(TDD)~~ mode of a wireless communication system, comprising means adapted to perform each of the steps of the method for High-Speed Downlink Packet Access ~~(HSDPA)~~ for Time Division Duplex ~~(TDD)~~ mode of a wireless communication system according to any one of the claims 1 to 14.
18. Wireless communication system for High-Speed Downlink Packet Access ~~(HSDPA)~~ for Time Division Duplex ~~(TDD)~~ mode, comprising means adapted to perform a method for High-Speed Downlink Packet Access ~~(HSDPA)~~ for Time Division Duplex ~~(TDD)~~ mode of a wireless communication system according to any one of the claims 1 to 14.

The usage and functionality connected to the addresses "0000" and "1111" is the same like described in combination with the first address coding procedure. A coded address "0000" may indicate that no one of the mobile terminal devices is addressed to initiate a data transmission. Correspondingly, an address "1111" may indicate an initialization of a data transmission to all four mobile terminal devices of the group.

In the following description, the address coding of the mobile terminal devices may be based on the first address coding mentioned and described above. The below presented description may be employed in a similar manner in combination with the above mentioned second address coding.

Fig. 2 shows a grouping of a plurality of mobile communication terminal according to an embodiment of the invention. A plurality of mobile terminal devices is shown in Fig. 2. The mobile terminal devices are grouped in five separate groups each comprising a subset of plurality of mobile terminal devices. The grouping and the number of mobile terminal devices within the different groups is exemplary and the grouping may performed in another arrangement. Since the address coding is based on the first address coding procedure the different groups may comprise maximal fourteen mobile terminal devices. Further, the number of groups may also be exemplary and not limited to the depicted five different groups.

A first group designated as group 1 may comprise exemplary four mobile terminal devices and the mobile terminal devices may be designated as UE 1, UE 2, UE 3 and UE 4, respectively. According to the address coding procedure, the addresses "0001", "0010", "0011" and "0100" may be assigned to the corresponding mobile terminal devices UE 1, UE 2, UE 3 and UE 4.

A second group designated as group 2 may comprise exemplary six mobile terminal devices and the mobile terminal devices may be designated as UE 5, UE 6, UE 7, UE 8, UE 9 and UE 10, respectively. According to the address coding procedure, the addresses "0001", "0010", "0011", "0100", "0101" and "0110" may be assigned to the corresponding mobile terminal devices UE 5, UE 6, UE 7, UE 8, UE 9 and UE 10.

A third group designated as group 3 may comprise exemplary three mobile terminal devices and the mobile terminal devices may be designated as UE 11, UE 12 and UE 13, respectively.

According to the address coding procedure, the addresses "0001", "0010" and "0011" may be assigned to the corresponding mobile terminal devices UE 11, UE 12 and UE 13.

A fourth group designated as group 4 may comprise exemplary six mobile terminal devices and the mobile terminal devices may be designated as UE 14, UE 15, UE 16, UE 17, UE 18 and UE 19, respectively. According to the address coding procedure, the addresses "0001", "0010", "0011", "0100", "0101" and "0110" may be assigned to the corresponding mobile terminal devices UE 14, UE 15, UE 16, UE 17, UE 18 and UE 19.

A fifth group designated as group 5 may comprise exemplary four mobile terminal devices and the mobile terminal devices may be designated as UE 20, UE 21, UE 22, UE 23 and UE 24, respectively. According to the address coding procedure, the addresses "0001", "0010", "0011", "0100" and "0101" may be assigned to the corresponding mobile terminal devices UE 20, UE 21, UE 22, UE 23 and UE 24.

The plurality of mobile terminal devices are divided into a plurality groups. The number of groups may and the division thereupon may be performed dynamically or statically. For example, the grouping (arrangement and/or number of groups) may be based on traffic load or N channel Hybrid Automatic Repeat Request (HARQ) scheme.

The following Fig. 3 may represent a time flow diagram according to an embodiment of the method of the present invention. The time flow diagram is based on the grouping presented above according to Fig. 2.

Fig. 3 shows frame diagram of a high data transmitting situation according to an embodiment of the invention. The five groups each comprising mobile terminal devices, shown in Fig. 2 may listen to the Paging Indicator Channel (PICH). According to this embodiment of the invention, the mobile terminal devices of one group may listen to the Paging Indicator Channel (PICH) every fifth frame. Correspondingly, group 1 may listen to frame 1, group 2 to frame 2, group 3 to frame 3, group 4 to frame 4 and group 5 to frame 5. Beginning with frame 6 group 1 may listen again thereto and further group 2 may follow in listening to frame 7. This sequencing of the groups may be continued. Analog to the grouping of the mobile terminal devices, the period of

enable the mobile terminal device to receive and decode the high-speed packet data in the Downlink Shared Channel (DSCH) by using this received and decoded downlink signaling information. A confirmation may be transmitted to the high-speed downlink packet sender, such as a Node B. The confirmation may comprise an acknowledge / negative acknowledge (ACK/NAK) and measurement report and preferably transmitted via the Uplink High-Speed Downlink Packet Access (HSDPA) Information Channel (UL-HICH).

This specification contains the description of implementations and embodiments of the present invention with the help of examples. It will be appreciated by a person skilled in the art, that the present invention is not restricted to details of the embodiments presented above, and that the invention can be also implemented in another form without deviating from the characteristics of the invention. The embodiment presented above should be considered as illustrative, but not restricting. Thus, the possibilities of implementing and using the invention are only restricted to the enclosed claims. ~~Consequently, various options of implementing the invention as determined by the claims, including equivalent implementations, also belong to the scope of the invention.~~

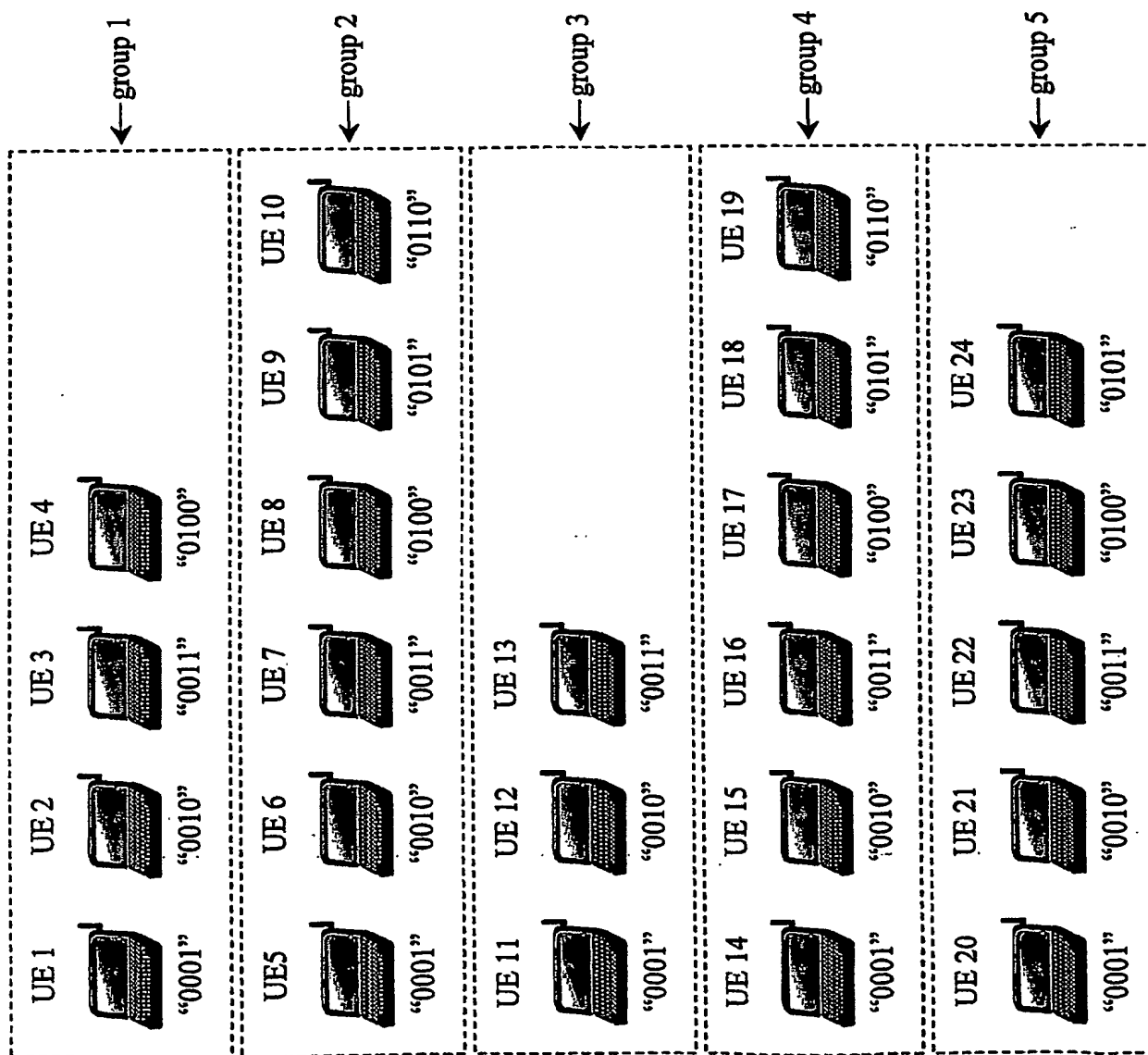


Fig. 2